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Published to advance the Science of cold-blooded vertebrates

BATRACHIANS FROM SOUTHWESTERN UTAH.

A collection of batrachians, obtained on the Brooklyn Museum's Expedition to southwestern Utah, while small in the number of species, nevertheless may be considered as fairly complete in its representation of the region.

Field work of the expedition was carried out from Bellevue, a small Mormon settlement in Washington County, elevation 4,000 feet. This base readily gave access to the lower deserts of the Virgin River country to the south, to the Great Basin country, elevation 5,500 feet, to the north, and to high mountain ranges and plateaus both east and west. The lack of standing bodies of water, except on the mountains and plateaus at elevations above 8,000 feet, and the turbulent character of the streams, many of them dry during the summer, naturally place a limit upon the development of batrachian life.

Scaphiopus hammondi hammondi Baird.

A very secretive, wholly nocturnal, but really common species. Its call, a loud crah-crah-rah, repeated at short intervals, was first heard at Bellevue late in April and again, following a cold spell, on May 5. Thereafter it increased in volume nightly until June 1, after which it decreased, stopping about June 15. Rain puddles, overflows from irrigation ditches, in fact every pool of standing water served as breed-

ing places. Drying up of the pools rarely permitted a development beyond the egg or early larval stages.

The ova are deposited in short strings attached to submerged grass and weeds. One lot of ova, obtained from a breeding pair on May 5 and placed in a rain barrel, by May 25 had developed into larvæ $\frac{3}{4}$ inches long, greenish black in color with faint indications of dorsal bands. The accidental upsetting of the barrel stopped further breeding experiments at Bellevue.

A small reservoir at Grapevine Springs, eight miles south of Bellevue, elevation 3,000 feet, on June 26, contained numerous larvæ with the limbs nearly fully grown. These measured $2\frac{1}{2}$ inches in length and were light olive green, dorsal bands well marked. A young spade-foot, just through its metamorphosis, captured on the same date, measured—head and body, $1\frac{1}{4}$ inches, hind leg from groin, $1\frac{1}{2}$ inches. The call of this toad was heard both on the Pine Valley Mountains and on the Kolob Plateau at elevations above 8,000 feet, during June.

Bufo woodhousei Girard.

Common at Bellevue, breeding during May in irrigation ditches and springs. Also observed on Pine Valley Mountains, 7,000 feet, and on Kolob Plateau, 7,000 to 9,000 feet. The call, a high-pitched, prolonged trill, is very much like that of *Bufo americanus*.

Bufo compactilis Wiegman.

A shy, but not uncommon species at Bellevue. Adults were taken only at night in breeding pools shared with *Scaphiopus*. Young toads on the other hand were found frequently during the day, resorting to dry situations on the foothills and pastoral lands. Many of them displayed bright spots and blotches of red, orange, or brown scattered over the rough, tubercular skin. Such ornamentation proved to be adaptive and in harmony with the color scheme of

their immediate environment. Specimens preserved in alcohol and formalin have lost the ornamental colors. Field notes do not mention the call of this toad.

Hyla arenicolor Cope.

Apparently the only *Hyla* in southwestern Utah. It is common about springs, irrigation ditches, and rapidly flowing streams in the region with drainage into the Colorado River, but does not extend far into the Great Basin country, for none were recorded on a former expedition to Beaver County, 100 miles north of Washington County. The color phases run from light gray to brownish black, with numerous roundish spots irregularly distributed and not forming well marked patterns, except on the hind legs, which appear banded. In the light and dark color phases the spots become obscure.

This tree frog was found most abundant on rocks and cliffs along swift running streams, and on tree trunks only when near the water. It is not an arboreal species. Ova were observed in the form of small clusters deposited along the margin of pools. The tadpoles, at first black, later become mottled gray when they resort to deeper water.

The loud, vibrating call of this species somewhat resembles that of *H. versicolor* but is lower in pitch. The frogs are most vociferous in the late afternoon and rarely are heard at night.

Rana pipiens Schreber.

Represented by six specimens collected in the reservoir at Iron Springs, Iron County, in the Great Basin country. The range of this species does not extend into the Colorado River drainage of southwestern Utah. In Beaver County and northward it is common.

Ambystoma tigrinum (Green).

Larvæ or axolotls, called "water dogs" by the Mormons, are common in most of the ponds and lakes

at elevations above 8,000 feet. Adults are less common. None were found on land. Four lots are at hand as follows:

1. Small, shallow pond, Oak Valley, Kolob Plateau, Washington Co., 9,000 ft., June 30, 1917, 8 specimens all larvæ, 3 to 5 inches.

2. Small, deep pond, Le Verkin Breaks, side of an old crater, Washington Co., 8,000 ft., July 1, 1917, 5 specimens, adults $6\frac{1}{2}$ to 7 inches; 6 specimens, larvæ $5\frac{1}{2}$ to 7 inches.

3. Duck Lake, Markagunt Plateau, Iron Co., 10,000 ft., July 17, 1917, 11 specimens, all larvæ, $6\frac{1}{2}$ to $7\frac{1}{2}$ inches.

4. Otter Lake, Tushar Mts., Beaver Co., 10,000 ft., August 20, 1904, 3 specimens, adult, 7 to $7\frac{1}{2}$ inches.

The adults from Le Verkin Breaks are comparable with examples from the East, except that the tail is more compressed and the color is dark olive green with faint blotches of yellow. The adults from the Tushar Mountains, on the other hand, suggest a different species in being much more massive in form, tail very deep and compressed, and color uniform dark slate above, much lighter below. In Duck Lake, a deep body of water four miles long and half a mile broad, the larvæ, or rather axolotls, are extremely abundant in spite of the fact that the lake contains trout of large size. Here special search was made for adults both in the water and on land, but none were found, and neither did several shepherds, who visit the lake every summer, have any knowledge of the salamander, except as a branchiferous aquatic creature. In life the axolotls are light olive green, obscurely mottled; branchiæ lavender, fringed with bright yellow; eyes golden.

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